DETERMINATION OF FATTY ACID METHYL ESTER BY TRANSESTERIFICATION REACTION OF WASTE COOKING OIL OBTAINED FROM DIFFERENT SOURCES

MARDIANA BINTI ABDUL RAHIM

Final Year Project Report Submitted in
Partial Fulfilment of the Requirements for the
Degree of Bachelor of Science (Hons.) Applied Chemistry
in the Faculty of Applied Sciences
Universiti Teknologi MARA

APRIL 2009

This Final Year Project Report entitled **"Determination of Fatty Acid Methyl Ester by Transesterification Reaction of Waste Cooking Oil Obtained from Different Sources"** was submitted by Mardiana binti Abdul Rahim, in partial fulfilment of the requirements for Degree of Bachelor of Science (Hons.) Applied Chemistry, in the Faculty of Applied Sciences, and was approved by

Pn. Siti Kartina binti Abdul Karim
Supervisor
B. Sc. (Hons.) Applied Chemistry
Faculty of Applied Sciences
Universiti Teknologi MARA
40450 Shah Alam
Selangor

Miss Sabrina Yahaya
Project Coordinator
B. Sc. (Hons.)
Applied Chemistry
Faculty of Applied Sciences
Universiti Teknologi MARA
40450 Shah Alam
Selangor

Dr. Yusairee Mohd
Head of Programme
B. Sc. (Hons.)
Applied Chemistry
Faculty of Applied Sciences
Universiti Teknologi MARA
40450 Shah Alam
Selangor

Date: 22/5/2009

ACKNOWLEDGEMENTS

In the name of Allah, the Most Gracious and the Most Merciful, I would like to express my gratitude to Allah S.W.T. because of blessing and consent which contributes to the success of complete this final project report entitled "Determination of Fatty Acid Methyl Ester by Transesterification Reaction of Waste Cooking Oil Obtained from Different Sources".

First and foremost, I would like to express my gratitude and million of appreciation to my supervisor, Pn. Siti Kartina binti Abdul Karim for her willingness to advice, valuable guidance, inspiring suggestions, constructive criticisms and encouragement me during the hard time for the accomplishment of this final year project.

I also would like to express my special thanks to the coordinator Final Year Project CMT 679, Miss Sabrina who is responsible to in charge this project and to the entire laboratory assistant for their kind guidance, idea, support, comment valuable consultation and cooperation.

A lot of thanks to my parent and every family member for their ending love and support, to all my friend who have been very helpful, and also to those involved directly or indirectly in helping me to achieve the success of this final year project.

TABLE OF CONTENTS

ABSTRACT

DETERMINATION OF FATTY ACID METHYL ESTER BY TRANSESTERIFICATION REACTION OF WASTE COOKING OIL OBTAINED FROM DIFFERENT SOURCES

Biodiesel is a fully renewable liquid fuel source that can be used as an alternative to petroleum diesel fuel. Biodiesel comprised of mono-alkyl esters of long-chain fatty acids derived from vegetable oils or animal fats. In this study, fatty acid methyl ester was produced from different sources of waste cooking oil. Waste cooking oil has suitable characteristics for transesterification reaction. The objective of this study was to determine the composition and percentage yield of methyl ester obtained from fried chicken waste cooking oil, reused waste cooking oil, and fried banana waste cooking oil. The parameters used were methanol/oil ratio expressing in volume of oil (10 ml) and methanol (12 ml), catalyst (0.6g KOH), and the operating temperature (55 °C). The methyl ester layer was analyzed by using Gas Chromatography Mass Spectrometer and the percentage yield was calculated. The major fatty acid methyl esters produced from different sources of waste cooking oil were octadecenoic acid methyl ester and hexadecanoic acid methyl ester. In this study, the percentage yield was in the range between 90-99%.